SP211/0105 *Waves* 2 Quiz Name _____

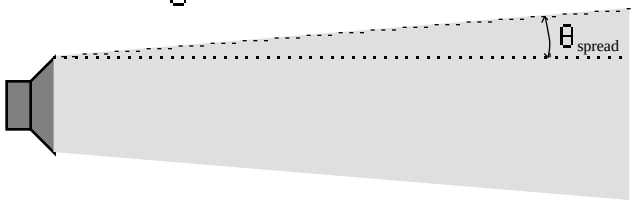
$$\sin(kx_1 - \omega t + \phi_1) + \sin(kx_2 - \omega t + \phi_2) = 2\cos(\delta/2)\sin(kx_{av} - \omega t + \phi_{av})$$

where $x_{av} = 1/2(x_1 + x_2)$; $\phi_{av} = 1/2(\phi_1 + \phi_2)$; $\delta = 2\pi/\lambda(x_2 - x_1) + (\phi_2 - \phi_1)$

1. Two sound sources ocscillate in phase with the same amplitude. They are separated by $2/3\,\lambda$. What is the amplitude of the resultant wave from the two sources at a point on the line joining the two sources if the amplitude due to each source separately is A? (Assume that the point is not between the sources.)

2. Sound waves from three identical souces driven in phase arrive at a point in phase. If the amplitude and intensity of the sound wave due to each source taken individually are A_0 and I_0 respectively, what are the amplitude and intensity of the sound wave at the point due to the three sources ?

3. A 30 *cm* diameter speaker is driven at 13600 *Hz*. Estimate the spread angle for the generated sound wave.



4. When a violin string is played simultaneously with a 440 *Hz* tuning fork, beats are heard at 2 *per second*. When the string is tightened slighly, the beat frequency increases slightly. What is the frequency of the violin string ?

$v_{sound\ in\ air} = 340\ m/s$